MACTEC ENVIRONMENTAL RESTORATION SERVICES, LLC

Spectral Gamma-Ray Borehole
Log Data Report

Log Event A

Borehole # 40-11-01

Borehole Information

Farm : S	**Tank :** S-111	**Site Number :** 299-W23-171
N-Coord : 35,960	**W-Coord :** 75,744	**TOC Elevation :** 664.66
Water Level, ft :	**Date Drilled :** 11/30/1971	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 145	

Borehole Notes:
This borehole was drilled in November 1971 and completed to a depth of 100 ft with 6-in.-diameter casing. This borehole was deepened in May 1973 to a depth of 145 ft. The driller's log contains no mention of perforations or grout.

The casing thickness is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. casing. The zero reference for the SGLS logs is the top of the casing, which is surrounded by concrete and is about 6 in. above the ground surface.

Equipment Information

Logging System : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 05/1996	**Calibration Reference :** GJPO-HAN-5	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number :	1	**Log Run Date :**	07/19/1996	**Logging Engineer:**	Bob Spatz
Start Depth, ft.:	144.5	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	59.5	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	07/22/1996	**Logging Engineer:**	Bob Spatz
Start Depth, ft.:	61.5	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	0.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	3	**Log Run Date :**	07/22/1996	**Logging Engineer:**	Bob Spatz
Start Depth, ft.:	65.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	48.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Event A

Borehole 40-11-01

Analysis Information

Analyst : D.L. Parker

Data Processing Reference : P-GJPO-1787 Analysis Date : 04/10/1997

Analysis Notes :

This borehole was logged in three log runs using a centralizer, with one of the log runs performed as a quality check by relogging a segment of the borehole. The pre- and post-survey field verification spectra met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration from the field verification spectra that best matched the data were used to establish the channel-to-energy parameters used in processing the spectra acquired during the three log runs.

Casing correction factors for a 0.280-in.-thick casing were applied during the analysis.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected continuously from the ground surface to 5 ft, at 6 ft, and continuously from 143.5 to 144.5 ft. The maximum Cs-137 concentration was 16.4 pCi/g at 1 ft, although a higher apparent concentration was detected at the ground surface.

The logs of the naturally occurring radionuclides show an increase in K-40 and U-238 concentrations at a depth of about 46.5 ft. The KUT concentrations increase at a depth of about 54 ft and from about 69 to 70 ft. The KUT concentrations decrease at depths from about 103 to 108 ft. U-238 and Th-232 concentrations increase gradually from a depth of about 122 ft to the bottom of the borehole.

Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Report for tank S-111.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of the rerun section is included that shows KUT concentrations from both the original log runs and rerun sections from 48 to 65 ft.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.